AMENDMENTS TO THE CLAIMS

Please amend claims 54, 58-62, and 67, cancel claims 1-4, 6-9, 11-30, 32-41, 55-56, 64-66, and 68-81 without prejudice, and add new claims 82-91, as shown in the following listing of claims, which will replace all prior versions and listings of claims in the application. Please cancel claims 1-4, 6-9, 11-30, 32-41, 55-56, 64-66, and 68-81 without prejudice to their pursuit in an appropriate divisional or continuation application. Claims 14-28 and 32-41 were previously withdrawn. Claims 54, 57-62, 67, and 82-91 are currently in the application.

Listing of claims:

1. – 53. (canceled)

54 (currently amended). A method for the production of cell cycle-specifically differentiated hematopoietic cells comprising:

a) culturing purified Lineage^{negative}Rhodamine^{low}Hoescht^{low} (LRH) bone marrow stem cells, from resting state, in the presence of a combination of steel factor, thrombopoietin, and FLT3-ligand under conditions that promote synchronous progression through the cell cycle, to obtain a majority of synchronously progressing bone marrow stem cells;

b) subsequent to step a), contacting the synchronously progressing bone marrow stem cells of step a) with ~~at least one growth factor or cytokine at a predetermined phase of the cell cycle~~ a combination of G-CSF, GM-CSF, and steel factor commencing at mid-S phase of the cell cycle; and

c) subsequent to step b), subculturing the cells of step b) until differentiated hematopoietic cells are produced, wherein:

i) megakaryocyte differentiation of the differentiated hematopoietic cells is greater than megakaryocyte differentiation in a second subculture subjected to an otherwise identical method but wherein step b) takes place at G_0 phase;

ii) platelet differentiation of the differentiated hematopoietic cells is greater than platelet differentiation in a second subculture subjected to an otherwise identical method but wherein step b) takes place at G_0 phase; or

iii) proliferative granulocyte differentiation of the differentiated hematopoietic cells is greater than proliferative granulocyte differentiation in a second subculture subjected to an otherwise identical method but wherein step b) takes place at G_0 phase.

~~wherein~~

~~i) the predetermined phase of the cell cycle is mid-S phase and the differentiated hematopoietic cells comprise megakaryocytes, platelets, or proliferative granulocytes; or~~

~~ii) the predetermined phase of the cell cycle is late S phase and the differentiated hematopoietic cells comprise mature or non-proliferative granulocytes.~~

55. – 56. (canceled)

57 (previously presented). The method of claim 54, wherein step c) is carried out for about 14 days.

58 (currently amended). The method of claim 54, wherein ~~the predetermined phase of the cell cycle is mid-S phase and~~ mid-S phase occurs about 32 hours after initiation of the culturing of the purified bone marrow stem cells under conditions ~~that promote~~ to

obtain a majority of the purified bone marrow stem cells undergoing synchronous progression through the cell cycle.

59 (currently amended). The method of ~~claim 54,~~ claim 84, wherein ~~the predetermined phase of the cell cycle is late S phase and~~ late S phase occurs about 40 hours after initiation of the culturing of the purified bone marrow stem cells under conditions ~~that promote~~ to obtain a majority of the purified bone marrow stem cells undergoing synchronous progression through the cell cycle.

60. (currently amended). The method of claim 54, further comprising:

d) subsequent to step c), isolating the differentiated hematopoietic cells from the subculture.

61 (currently amended). The method of claim 54, wherein the ~~predetermined~~ mid-S phase ~~of the cell cycle~~in step b) comprises a differentiation hotspot favoring a specific differentiation pathway at ~~the predetermined~~ mid-S phase ~~of the cell cycle~~.

62 (currently amended). The method of claim 54, wherein the ~~predetermined~~ mid-S phase of the cell cycle in step b) comprises a reversible differentiation hotspot favoring a specific reversible differentiation pathway at ~~the predetermined~~ mid-S phase of the cell cycle, wherein ~~a differentiated cell arises from a stem cell~~the differentiated hematopoietic cells of step c) arise from the bone marrow stem cells of step b).

63. – 66. (canceled)

67 (currently amended). The method of claim 54, wherein prior to step a), the bone marrow stem cells are isolated by fluorescence activated cell sorting (FACS).

68. – 81. (canceled)

82 (new). The method of claim 54, wherein culturing step a) further comprises culturing the purified Lineage^{negative}Rhodamine^{low}Hoescht^{low} (LRH) bone marrow stem cells, from resting state, in a rotating wall vessel (RWV).

83 (new). The method of claim 54, wherein subculturing step c) further comprises subculturing the cells of step b) in a rotating wall vessel (RWV) until differentiated hematopoietic cells are produced.

84 (new). A method for the production of cell cycle-specifically differentiated hematopoietic cells comprising:

a) culturing purified Lineage^{negative}Rhodamine^{low}Hoescht^{low} (LRH) bone marrow stem cells, from resting state, in the presence of a combination of steel factor, thrombopoietin, and FLT3-ligand under conditions that promote synchronous progression through the cell cycle, to obtain a majority of synchronously progressing bone marrow stem cells;

b) subsequent to step a), contacting the synchronously progressing bone marrow stem cells of step a) with a combination of G-CSF, GM-CSF, and steel factor commencing at late S phase of the cell cycle; and

c) subsequent to step b), subculturing the cells of step b) until differentiated hematopoietic cells are produced, wherein mature or non-proliferative granulocyte differentiation of the differentiated hematopoietic cells is greater than mature or non-proliferative granulocyte differentiation in a second subculture subjected to an otherwise identical method but wherein step b) takes place at G_0 phase.

85 (new). The method of claim 84, wherein step c) is carried out for about 14 days.

86 (new). The method of claim 84, further comprising:

d) subsequent to step c), isolating the differentiated hematopoietic cells from the subculture.

87 (new). The method of claim 84, wherein the late S phase of the cell cycle in step b) comprises a differentiation hotspot favoring a specific differentiation pathway at late S phase.

88 (new). The method of claim 84, wherein the late S phase of the cell cycle in step b) comprises a reversible differentiation hotspot favoring a specific reversible differentiation pathway at late S phase of the cell cycle, wherein the differentiated hematopoietic cells of step c) arise from the bone marrow stem cells of step b).

89 (new). The method of claim 84, wherein prior to step a), the bone marrow stem cells are isolated by fluorescence activated cell sorting (FACS).

90 (new). The method of claim 84, wherein culturing step a) further comprises culturing the purified Lineage^{negative}Rhodamine^{low}Hoescht^{low} (LRH) bone marrow stem cells, from resting state, in a rotating wall vessel (RWV).

91 (new). The method of claim 84, wherein subculturing step c) further comprises subculturing the cells of step b) in a rotating wall vessel (RWV) until differentiated hematopoietic cells are produced.